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Editor :
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Professor of Anatomy, The Royal Veterinary College.

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EDITORIAL

FURTHER PROGRESS IN 1943

THE end of another year is approaching and this number completes the 99th volume of THE VETERINARY JOURNAL. Next year the Journal, though not 100 years old (it was founded in 1875), will enter on its hundredth volume, and it is hoped to review some of the forward steps in veterinary medicine during the century, with special reference to publications. During the present year THE VETERINARY JOURNAL has been able to place before its readers matters of current interest in the form of original articles, records of clinical experiences and the results of work and observations in this and other countries in the form of abstracts from literature recently published. Some of the more outstanding articles published in the current year in the Journal include those on trichomoniasis in the cow and in the bull; chemotherapy and its application in the treatment of diseases of livestock; veterinary jurisprudence; spirochætosis of fowls; tuberculin in advanced cases of tuberculosis. Articles from workers and observers abroad have also been produced and there have been more clinical records during the past year than of late. It is gratifying that in these times of stress veterinary surgeons and others still have the inclination and urge to place on record the results of their work, observations, opinions and ideas. It is only by so doing that we can play our part in advancing the knowledge acquired in our time and in keeping our place in the progress which is being made. A perusal of the literature during the year dealing with the various sciences indicates clearly that rapid strides are being made in our knowledge of some of the diseases affecting livestock. Further efforts are necessary in this direction: we are sufficiently optimistic at this time to forecast still more rapid strides as the years go on.

General Articles

TOXIC EFFECTS IN THE FEEDING OF COCOA MEAL TO PIGS

By R. BRAUDE, B.Sc., Anim.Husb.D.
National Institute for Research in Dairying, University of Reading

Introduction

In a paper previously published (Braude and Foot, 1942) an account was given of experiments with pigs in which a cocoa cake meal, a by-product of the chocolate industry, was used as a feeding stuff for pigs. Since the outbreak of war a greater quantity of cacao bean has been imported into this country to provide a source of fat for the margarine industry. Cocoa meal, which is the residue left after the extraction of the cocoa butter, has hitherto been a waste product, and some attempts have been made to utilise it as a feeding stuff for animals. On the basis of our previous experience, and also from the evidence in the literature, it appeared likely that the high theobromine content of the product would render it unsuitable as a feeding stuff. The removal of the theobromine has unfortunately remained unpractical on a commercial basis. There was, however, a possibility that the inclusion of only a small proportion of cocoa meal in meal mixtures for pigs would not cause adverse effects. At the same time it was also desirable to estimate the food value of the cocoa meal.

Description of the Product Used

The by-product of the margarine industry used in the experiments reported below is a residue left after the cocoa butter has been extracted from the cacao bean. The method employed for the extraction was a hydraulic pressure method as used for other oil seeds. In this process the whole bean, both shell and kernel, is crushed and the oil expressed. A temperature of about 160 degrees F. is used. The residue, which is generally in a cake form, is ground into a meal. The detailed composition of this resultant cocoa meal is given in Table 2. Its theobromine content was 2.8 per cent., and it also contained 1.4 per cent. caffein. When compared with cocoa cake meal, the by-product of the chocolate industry as used in our previous experiments, the cocoa meal appeared darker in colour and less pleasant in taste and smell.

Experimental

The object of our experiments has been to find whether the cocoa meal with its theobromine unextracted is of any value as a feeding stuff when fed at low levels, and whether its inclusion in war-time diets of fattening pigs is justified.

The investigation has been carried out in three trials. In all of them Wessex Saddleback and Large White weaners, purchased from the University Farm, Sonning, were used. They were 14-15 weeks old at the commencement of the experiment.

Experiment 1

Twenty weaners were divided into four groups, each containing five pigs selected on the basis of similarity to one another in initial weight, sex and litter

origin. Four treatments were used, and these were allocated to the four groups at random. Group 1 received a normal fattening ration. Group 2 received the same ration except for 5 per cent. of the ground oats replaced by cocoa meal. Group 3 was a negative control treatment, in which the nutrient intake was reduced by 5 per cent.; thus the ration supplied the same nutrients as the non-cocoa portion of the diet of group 2. Group 4 received the group 1 ration, with 7½ per cent. of the ground oats replaced by cocoa meal. Unfortunately, the normal fattening ration, which was primarily designed to be poor in quality and to resemble closely average war-time fattening mixtures, proved unsuitable due to faulty consignment of dried food waste originally included in the rations. The basal rations were therefore changed and the details of the final rations are given in Table 1.

This change-over delayed the start of the experiment by nearly three weeks, during which time the growth of the pigs, irrespective of ration, was inhibited. At this time, too, one pig from both groups 3 and 4 was discarded, as they appeared so run down in condition that recovery seemed unlikely.

The experimental meals were all mixed by hand in the piggery. Table 2 gives details of the chemical composition of each of the constituents, together with the calculated composition of each of the meal mixtures used. The pigs in each group were fed collectively, receiving their meal in the form of a wet mash, 3 lb. of water being allowed for each lb. of meal. No extra water was supplied. The amount of meal fed daily was based on live weight and according to the scale recommended by the Pig Experiments Co-ordination Committee (quoted by Braude and Foot, 1942a).

All the pigs except those in group 4 (see later) were kept on the experiment for 24 weeks (168 days) from the date of changing over to the new rations, August 21, 1942.

Results

All the pigs on this experiment grew at a very slow rate, a fact mainly due to the poor quality of the meal fed and perhaps also to the interruption of normal growth during the period preceding the experiment. Both the average daily live weight gain and the food utilisation figures shown in Table 3 are well below normal. Nevertheless, it is evident that the pigs in group 4 receiving 7½ per cent. cocoa meal grew at a slower rate than either the positive or negative control pigs. The animals in group 4 refused a portion of their food, the amount of refusals growing as the experimental period progressed. They became unthrifty in appearance and lethargic and began to scour (dark diarrhœa). During the fifteenth week of the experiment one pig died in this group and a further two died within a fortnight. These two pigs for the last few days of their lives behaved quite abnormally. They did not consume their food, and were lying in the corner of their pen without moving at all, even when disturbed. When forced to get up the pigs walked in lethargic manner, were unsteady on their feet and apparently very weak. On two consecutive days preceding their death the rectal temperatures were taken and found to be 105.8 degrees, 105.6 degrees, and 106.2 degrees, 105.6 degrees for each of the pigs respectively. The high temperatures suggest that the animals were struggling with the toxic substances in their bodies.

On all three pigs which died a post-mortem examination has been carried out by Dr. N. S. Barron, with results identical in each case. These can be summarised as follows: There were extensive areas of pneumonia throughout both lungs and general pleurisy over the whole serous surface with firm attachment to ribs and diaphragm. On section there were large hæmorrhagic areas from which grey purulent fluid could be squeezed. The heart was normal, but the amount of pericardial fluid excessive. The liver was very congested and deep magenta in colour. The stomach and large intestines were also intensively congested. The kidneys, bladder and spleen were normal.

At the time of the death of the third pig the only remaining pig in group 4 was showing similar adverse symptoms, as its group-mates had done, and it was decided to change its diet to that of the control pigs. (Diet 1.) It took this pig about 10 days to recover from its condition, after which it appeared normal.

There appear to be no significant differences in live weight gain and food utilisation figures between groups 1, 2 and 3. At slaughter an examination of all the organs was carried out. In four pigs from group 2, which received 5 per cent. cocoa meal, congestion and red hepatisation of parts of the anterior lobes of the lungs was observed. Two of these pigs had also slightly inflamed stomachs and large intestines. No other abnormalities were observed. The results suggest that 5 per cent. cocoa meal in the diet was not sufficient to cause toxic symptoms. There seems to be no advantage in including this small quantity of cocoa meal for the comparison of the results for groups 2 and 3 show no increased gain in weight due to the addition of cocoa meal. Slight difficulty in interpretation of the results arises, however, from the fact that the positive control animals (group 1) failed to grow at a better rate than the negative control group (group 3). Evidently the difference of 5 per cent. of rather poor quality ground oats was not large enough to cause a significant difference in growth.

Experiment 2

Two groups of four pigs each were put on a modified Lehmann system of fattening, 3 lb. of meal being fed per animal daily and the rest of the ration given in the form of bulky farm foods. After 10 weeks the meal allowance was raised to 3½ lb. per head daily. One of the groups acted as a control group while the pigs in the other group received in addition to their meal allowance 5 per cent. raised after 10 weeks to 10 per cent. cocoa meal. The details of the composition of the basal meal are given in Tables 1 and 2. (Meal mixture 5.) The bulky foods were changed from time to time according to the supplies available; mangolds, cabbage and kale were used, both groups receiving exactly the same amounts. Thus the only difference between the two groups was that one group received an addition of 5-10 per cent. cocoa meal to their basal diet.

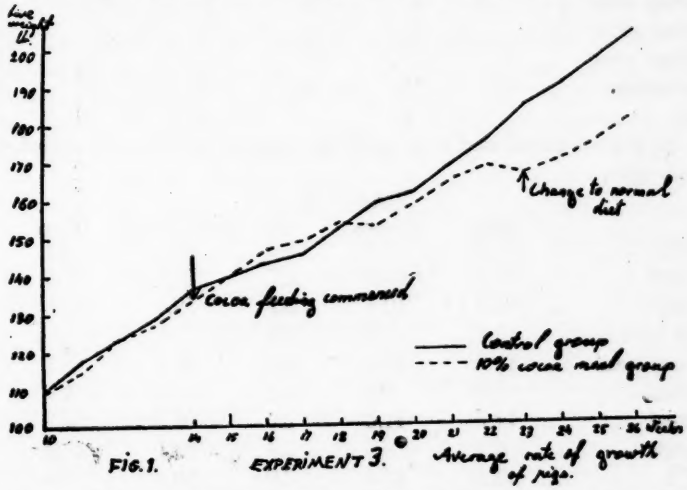
Results

During the experimental period, which lasted 25 weeks (175 days), the average daily live weight gain in the two groups was: 0.75 lb. of the control group and 0.74 lb. for the group receiving the cocoa meal. Towards the end of the experimental period the animals receiving cocoa meal in their ration did not eat the food allotted to them. They appeared slightly rougher in coat and

one of the pigs scoured, but no other abnormal symptoms were observed. The results of this trial indicate that while the cocoa meal did not exercise in this case a noticeable toxic effect, its addition to the ration did not prove beneficial. It may be that the small nutritional value which the product should have according to its chemical composition is outweighed by the toxic effect the material exercises. This, however, when the cocoa meal is added only in small proportion of the total ration is not sufficient to affect growth.

Experiment 3

In view of the results of a previous experiment (Braude and Foot, 1942), two groups of five pigs each were kept for 14 weeks on a control diet (meal



mixture 1, see Tables 1 and 2), after which period one of the groups received a similar diet except that 10 per cent. of wheat feed was replaced by cocoa meal, while the other group received exactly the same diet except for the cocoa meal, which in this case was not replaced by any other foodstuff. Thus the pigs in the control group received 10 per cent. less meal at each feeding than they should have received according to their live weights.

Results

The group of pigs receiving the 10 per cent. cocoa meal in their diet grew very poorly, and as the experimental period progressed toxic symptoms became more and more evident. The animals in this group showed poor appetite, appeared lethargic and scoured. After being nine weeks on the experiment the condition of the pigs became rather similar to that of pigs in group 4 of the first experiment, which received the 7½ per cent. cocoa meal. The rectal temperatures of all the pigs were taken daily, and while the pigs in the control group had normal temperatures ranging from 101.5-102.4 degrees F., two pigs of the cocoa group showed temperatures of 105.0-105-6 degrees F. During the ninth week one of the pigs died. The post-mortem showed identical changes to those described in experiment 1. Two other pigs appeared to be very severely

affected, but to avoid further losses the diet of this group was changed to the control diet, and all the pigs in both groups were fed according to the normal feeding scale. Since the change in their diet the affected pigs improved gradually

TABLE 1

Meal Mixture	1	2	3	4	5 (Experiment 2)
Cocoa meal	—	5	—	7½	—
Wheat feed	53	53	53	53	41
Ground oats	27	22	22	19½	25
Meat and bone meal ...	9	9	9	9	7
Ground nut meal ...	3	3	3	3	7
Barley meal	3	3	3	3	—
Dried grass	3	3	3	3	3
Potato meal	—	—	—	—	15
Limestone	1½	1½	1½	1½	1½
Salt	½	½	½	½	½

All the pigs received weekly a small quantity of cod liver oil added directly to their troughs.

TABLE 2

	Water	Protein	Oil	Carbohydrates	Fibre	Ash
Cocoa meal	13.5	23.2	5.6	42.6	9.1	6.0
Wheat feed	13.7	14.9	2.7	57.3	7.5	3.9
Ground oats	13.1	10.5	3.7	59.4	10.8	2.5
Meat and bone meal...	13.4	51.0	3.5	—	—	28.3
Ground nut meal ...	11.7	49.1	1.2	26.9	5.5	5.6
Potato meal	13.0	9.5	0.2	71.0	1.9	4.4
Barley meal	11.7	11.0	2.0	64.8	6.3	4.2
Dried grass	6.3	8.6	2.4	52.1	24.2	6.4
Mixture 1	13.1	17.4	2.9	50.8	8.0	7.5
„ 2	13.1	18.0	3.0	49.9	7.9	7.7
„ 3	12.5	16.9	2.7	47.8	7.4	7.4
„ 4	13.2	18.3	3.1	49.5	7.8	7.8
„ 5 (Expt. 2)...	13.0	17.4	2.5	52.6	7.2	7.2

TABLE 3

	Group 1	Group 2	Group 3	Group 4
Average daily live weight gain up to the 15th week of the experimental period, lb.	0.71	0.71	0.71	0.59
Throughout the experimental period, lb.	0.76	0.76	0.75	—
Average amount of food per 1 lb. live weight gain up to the 15th week of experimental period, lb.	5.3	5.4	5.2	6.5
Throughout the experimental period, lb.	6.0	6.1	6.0	—

and within a fortnight recovered completely. The diagram in Fig. 1 shows the average live weight of pigs in the two experimental groups throughout the experimental period. At slaughter three pigs which received cocoa meal had

lungs similarly affected as the pigs from group 2 in experiment 1. The results of this experiment indicate that a meal mixture containing 10 per cent. cocoa meal exerts toxic effect even on older pigs which will not only interfere with the growth of the animal but may prove fatal.

Discussion

The experiments reported here have confirmed that cocoa meal containing about 2.5 per cent. theobromine has no value as a feeding stuff for pigs. Harmful effects of feeding it in quantities over 7½ per cent. of the total ration were recorded, and a number of pigs died as a result of feeding it. Smaller quantities appear not to exert a definite toxic effect, but there is a possibility that the normal fattening period is not long enough to allow the symptoms to manifest themselves.

The experiments were not designed to establish a definite nutritive value of the cocoa meal, but it appears that if the product has any feeding value at all this is counterbalanced by the toxic effect it exerts. The apparent discrepancy with the results of a previous experiment, in which cocoa cake meal was found harmless when fed to older pigs, can be explained by the facts that the pigs concerned were kept in an open paddock, the quality of their diet was much better and the cocoa product used was of different origin, with a slightly lower theobromine content. As far as the by-product of the margarine industry is concerned, the experiment proved conclusively that the material is toxic for older pigs when included at a 10 per cent. level in the diet. It is quite possible that the quality of the total ration plays a part in determining how soon the adverse factors caused by the cocoa meal appear and the degree of their severity. The inclusion of cocoa meal in poor quality war-time fattening mixtures seems to increase the disadvantages of such action.

An interesting feature of these experiments was the fact that all the pigs adversely affected by the feeding of cocoa meal developed more or less severe pneumonic changes in the lungs. We find it impossible to offer a satisfactory explanation for this correlation except noting our belief that it was of a secondary character.

Summary

Forty-four pigs were used in three group feeding trials, in which the toxicity of cocoa meal was proved when the product was fed at 7½ per cent. of the ration. At 5 per cent. level the material is not noticeably toxic, but there appears to be no advantage in including it in the diet of fattening pigs, as its nutritive value seems to be very small or at any rate counterbalanced by, at this level, non-apparent, toxic effects of the theobromine.

Acknowledgments

The experiments reported here were carried out under the auspices of the Substitute Feeding Stuffs Committee of the Agricultural Research Council, represented as far as these experiments are concerned by Dr. S. Bartlett, whose advice and co-operation is gratefully acknowledged.

The author's thanks are also due to Dr. S. J. Rowland, who carried out the chemical analysis, and to Dr. N. S. Barron, for the veterinary supervision.

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Braude, R., and Foot, A. S. (1942a): *J. Agric. Sci.*, *32*, 73, Table 2.

XUM

CONGENITAL ATRESIA OF THE ILEUM AND COLON

By J. T. STAMP,
Pathology Department, Royal (Dick) Veterinary College, Edinburgh

CONGENITAL atresia and stenosis of the alimentary tract has been commonly described in the human subject and is a well-recognised condition in the new-born child. Recent references to similar conditions have not been found in veterinary literature. Williams, however, mentions their occurrence in his text-book of "Diseases of the Genital Organs." It was therefore thought worth while to record two cases of atresia of the intestine occurring in domestic animals, one in a calf and the other in a foal. Both of these cases were seen recently while doing routine autopsies at the Royal (Dick) Veterinary College.

Case I

Calf—female.

History.—Calf has been off its milk since birth, six days previously.

Post-mortem Examination.—The subcutaneous tissues and the skeletal musculature are dehydrated.

The pericardial sac, heart (280 g.) and large vessels show no abnormality.

Both lungs (right 270 g., left 220 g.) are seen to be aerated, of normal consistence, and, for the most part, pink in colour; the dorsal part of the left apical lobe, however, is dark purple in colour, due to hypostatic congestion. There is no sign of consolidation.

The mouth, pharynx and œsophagus appear normal. The rumen contains a clot (70 gms.) of coagulated milk, while the reticulum and omasum contain no food. No abnormality is seen in any of these organs. The duodenum is normal (2 cms. diam.), but as the jejunum is reached the diameter of the bowel gradually increases (3-4 cms.) and finally, about two-thirds of the way along the small intestine, the lumen ends in a blind sac (12 cms. in diam.). This blunt end of the ileum has no mesenteric attachments and is situated in the ventral part of the abdomen on the left side, projecting caudally to the entrance of the pelvis. This portion of the bowel contains a considerable quantity of yellowish brown, evil smelling fluid; the mucous membrane shows extensive ulceration. The distal and disconnected part of the intestine (ileum, cæcum and colon) is situated in the pelvic cavity and obviously has been non-functional. It begins as a blind sac (1 cm. diam.), from which continues the remaining portion of the ileum until it reaches the cæcum, which is 6 cms. long. From the cæcum, the colon passes into the normal convolutions and so to the rectum. Both the rectum and anus are perforate. Nothing worthy of note is found in the liver, pancreas or spleen. (Liver 380 gms., spleen 69 gms.)

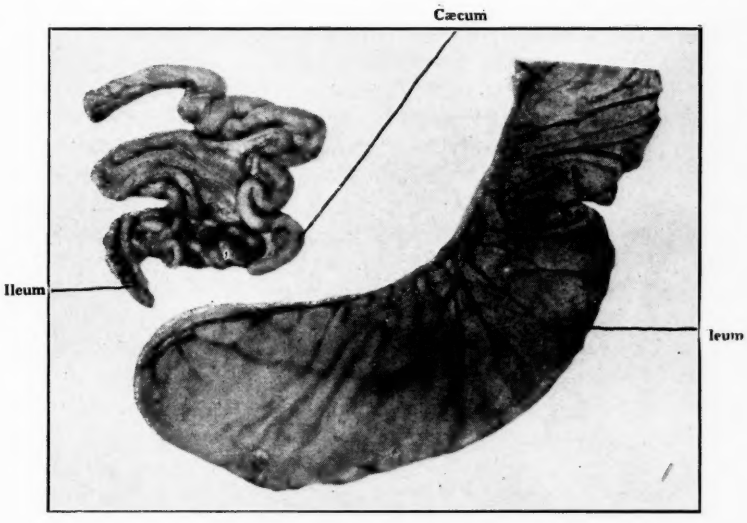
The urogenital system shows no abnormality (left kidney 60 gms., right kidney 80 gms.).

The umbilical cord and vessels are free from any obvious abnormality.

Case II

Foal.

History.—The foal immediately after birth had difficulty in suckling, but eventually managed to do so. No meconium was passed per rectum, so that



CASE I.—Large dilated pouch of Ileum and small non-functional colon, cæcum and rectum of calf. x $\frac{1}{4}$.

castor oil was given. Soon afterwards the animal was obviously in pain, temperature 103 degrees F. An enema was given, but without success. Death took place a few hours later. The animal had lived for about 21 hours.

The mare had two foals previously—both quite healthy.

Post-mortem Findings.—Unfortunately only the alimentary canal was submitted for examination.

The small intestine is dilated, the duodenum (6 cms. diam.) being more dilated than the ileum (1.5 cms. diam.). The whole of the alimentary tract contains a dirty, brown, evil smelling fluid. The ileum enters the cæcum in the normal way. The cæcum is very large and grossly distended and is packed with solid, brown meconium, and, although distended, retains its normal shape, being approximately 39 cms. long and 10 cms. in diameter.

Examination of the cæcum shows that the cæco-colic valve is present and that leading from it is a small blind diverticulum representing the proximal part of the colon; it is 1.5 cms. long.

The distal part of the colon begins as a free blind pouch 3 cms. in diameter and passes back to the rectum in the normal way, maintaining a diameter of 2 cms. throughout its length. A feature of the colon is that no tæniæ are present, and in this it differs from the cæcum. Neither the colon nor rectum contains meconium or other matter. No part of the bowel shows ulceration.

Discussion

The various theories advanced as regards the etiology of this condition are numerous, and a great deal of literature has been published on this subject as it occurs in the human subject. Although it seems probable that the factors will vary from case to case, they can roughly be divided into two groups.

In the first group are included those forms considered to be the result of some abnormality in the embryogenesis of the alimentary tract, e.g., developmental anomalies of the mesenteric vessels with a consequent malformation of the associated region of the gut; pressure on the duodenum at the point where it passes through the mesocolon; deficient secretion of bile during intra-uterine life; traction of a persistent umbilical cord by which the loop of bowel, which has been extruded into the root of the cord, is prevented from returning into the abdominal cavity; strangulation of a loop of bowel by the closing umbilical ring; atrophy of the vitelline duct also involving the intestine; and, finally, that occlusions may result through the complicated process of development of the duodenum and surrounding organs.

The second group includes those forms of atresia which are thought to be the result of some intra-uterine disease, e.g., volvulus, intussusception, enteritis and peritonitis.

Consideration of the possible etiological factors of this condition show that many of them cannot apply to the two cases described. Pressure on the duodenum by the mesocolon is impossible, since in both cases the atresiæ were below that level. As regards the theory of deficient secretion of bile, it is hard to understand how this could cause non-development of the more distal parts of the intestine while allowing full development proximally. The several theories which indicate the involvement of the gut in the umbilical ring are not supported

XUM

by evidence in the above cases, since these developmental defects did not exist. The theory that the atresiæ arise through malformation of the duodenum is impertinent, since the duodenum was not involved in either case. Maldevelopment of mesenteric vessels may have been the essential factor in both cases, the absence of mesenteric attachments to the blind pouch of the ileum in Case I being confirmatory evidence for this theory.

Consideration of the theories explaining the condition to be a result of intra-uterine disease again indicates that some are inapplicable in the two cases described. Volvulus, intussusception, peritonitis, tumour of the liver and hypertrophy of the pancreas, etc., can be excluded, since there is no indication that they had ever existed, and it is extremely unlikely that such conditions with their associated lesions could completely disappear. Fœtal enteritis, on the other hand, is a possible causative factor, and, in fact, an extensive ulcerative enteritis was present in Case I; this, however, was probably a result of the atresia and not the cause.

Summary

Two cases of atresia of the bowel are reported, one of the ileum and the other of the colon. Various ætiological theories are discussed with reference to these cases.

AN ABNORMALLY DEVELOPED PRONATOR TERES MUSCLE IN THE HORSE

By J. A. TAYLOR,
Department of Anatomy, Royal (Dick) Veterinary College, Edinburgh.

In text-books of Comparative Anatomy the pronator teres muscle in the horse occupies an insignificant place in the description of the muscular system, in fact, several anatomists do not mention this muscle.

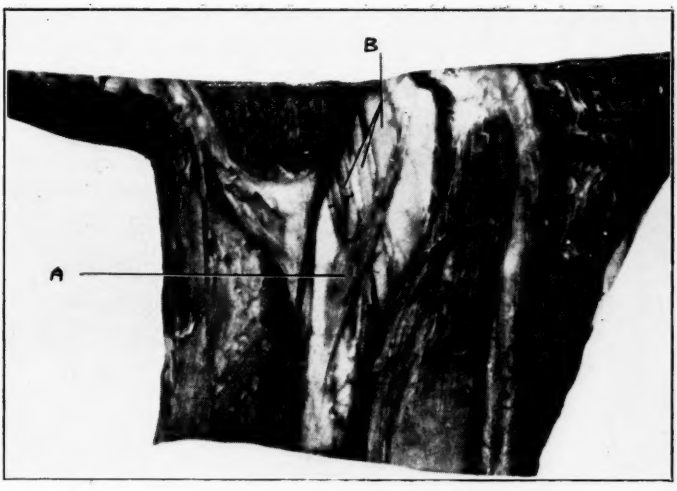
Sisson and Grossman (1938) refer to it as follows:—"on removing the deep fascia on the medial surface of the elbow the student may notice a small muscle lying along the collateral ligament. This is the pronator teres, which is normally not present, or a mere vestige in the horse. It is normally represented by a tendinous band."

Ellenberger and Baum (1932) state that the muscle is present in ruminants and swine, but is very rudimentary in the horse, where it is situated on the medial aspect of the elbow joint between the medial epicondyle of the humerus and the proximal part of the medial border of the radius.

Paul Martin (1904) describes the muscle in a similar manner to the above.

Neither Bradley (1920) in "The Topographical Anatomy of the Limbs of the Horse" nor McFadyen (1922) in "The Anatomy of the Horse," mention the muscle, nor do Bourdelle and Bressou (1937) in "Anatomie Régionale des Animaux Domestiques."

The specimen was noted in a pit-pony of the type we use here for dissecting purposes, and as will be seen from the adjoining photograph the muscle is well defined and, for the horse, very well developed. It was present in both



Medial aspect of the Elbow Joint. A = M. Pronator teres. B = Median vessels and nerve.

fore limbs at the medial aspect of the elbow joint, arising by a well-defined tendon from the medial epicondyle of the humerus. This tendon was succeeded by a fleshy belly, narrow at first but increasing in width to its insertion into the distal part of the superficial portion of the medial collateral ligament of the elbow joint. In all, this muscle was six inches in length and half an inch at its widest part, superficially related to the superficial pectoral muscle, deeply it ran obliquely across the median vessels and nerve.

In twelve years in the Anatomy Department here I have only on rare occasions encountered the muscle in a tendinous form, certainly never as well developed as in this specimen. Professor Grahame, with a much longer experience, agrees with this observation. It is of purely academic interest, but so exceptional that I considered the finding worthy of recording.

Summary

The pronator teres muscle in the horse is in the great majority of cases non-existent. It may, however, be present in a tendinous form and very rarely as a true muscular structure.

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Clinical Cases

EVERSION OF THE URINARY BLADDER

By MARTIN SENIOR, M.R.C.V.S.,
Dunstable

SUBJECT: Irish setter bitch, about six years old, heavy in whelp.

This dog was brought to my surgery by a boy, as it had a lump under its tail and it was due to have pups in a few days.

Examination revealed a pear-shaped swelling with a diameter of about 2 ins. protruding from the lips of the vulva. The boy said: "They saw it yesterday, and it could not make water properly, and it dripped water about."

Careful examination showed it to be the urinary bladder completely everted. It had been exposed for some time, for the bulbous end was very thickened and hair was matted to it. The point of entry of each ureter could be seen near the neck of the bladder on the dorsal aspect.

As it was impossible to return the bladder to its normal position the dog was sent home, and later I visited the owners to explain the state of affairs—that a general anæsthetic would be necessary, as it was not possible to replace bladder without (I tried), and that I was doubtful whether this would be possible, owing to the swollen nature of the organ. Also, as she was due to whelp in three to four days it was possible it might not be retained when straining to whelp. The dog was destroyed at owner's request.

It appears that on the previous morning (thirty-six hours before I saw it)

the dog passed water normally—a very good flow; and as she was very heavy in whelp it is probable that a violent straining must have taken place (pre-labour pain?) and so produced the eversion.

PYELONEPHRITIS

SUBJECT: Cow, black and white Fresian, six to seven years old.

On January 5, assisted calving—large dead calf. This was her fourth calving. Everything progressed normally, cleansings coming away in twenty-four hours.

On April 12 this cow passed "red water" during the afternoon, but when I saw her she passed an apparently usual quantity of normal urine which was clear from blood. The cow was not feeding properly, so Epsom salts and stomachic powders were left. The temperature was normal.

During the next few days the cow appeared usual, except that blood was seen in the urine on one or two occasions.

On April 18 the cow passed a quantity of thick, white slime in her urine. Rectal examination revealed the uterus to be normal. The bladder was over brim of pelvis and difficult to palpate. It was possible to palpate the posterior part of the right kidney and the lobes appeared to be definitely enlarged.

The owner was warned that this appeared to be a case of kidney trouble and that the slime was muco-purulent material from the bladder and possibly from the kidney. He elected to treat rather than kill, so a course of urinary antiseptics was prescribed and the bladder douched with 1 : 1,000 Euflavine and later with boracic solution.

The case gradually worsened, the cow rapidly lost flesh, passed much of the muco-purulent material in urine and frequently had pain when attempting to micturate. Appetite varied considerably, but gradually cow went off food.

The animal was slaughtered on May 5 and the butchers weighed the two vast kidneys (about 15-18 ins. long), which were 23 lb. together. Small abscesses could be seen beneath the capsules. The pelvis of each was distended with vast quantities of the muco-purulent material—yellowish-white in colour. The ureters were thicker than a man's thumb and there was cystitis, and both contained purulent material. Uterus had a small quantity of white catarrhal material in left horn. Rest of carcase (except for lungs—T.B.) was passed as fit for food.

FISTULA OF A LYMPHATIC DUCT

SUBJECT: A young crossbred Shorthorn cow. (This case seen whilst assistant to Mr. W. Shipley.)

The owner reported that this cow had run into a projecting nail whilst entering cowshed for afternoon milking and had a hole in its neck from which a fluid looking like "milk" was running.

On arrival I found that a large nail had caused a deep puncture wound in the skin at the base of the neck, a little above and slightly anterior to the point of the shoulder. The external opening was ½ in. to 1 in. long, and from

this welled a white opaque fluid which, to look at, resembled milk. There was much fluid escaping—a continuous flow which, on digital pressure, ceased, but when pressure was released welled out again.

I plugged the wound with tow soaked in antiseptic, and when this was removed the next morning there was no fluid escaping and the wound healed without further trouble.

It would appear that the nail (and it must have been a big one) had punctured a lymphatic duct, leaving the prescapular or superficial lymph node for the posterior cervical gland. From the nature of the fluid it is also probable that the thoracic duct might have been injured at a point near its entrance into the jugular vein. The ease with which the escape of fluid was stopped lends colour to the old adage: "The fluids of the body exhibit a great tendency to run in their normal course even when the duct which conveys them is injured."

Abstracts

AN OPPORTUNITY FOR RABBIT BREEDERS*

By G. S. TEMPLETON

THE following extract is taken from the above article:

Sexing Very Young Rabbits.—"Many times it would be profitable for rabbit breeders to sex very young rabbits. Dependable information on this subject would be specially useful to breeders with a market for breeding or laboratory animals. It is possible to determine accurately the sex of the day-old rabbit, but it is easier to distinguish the sex at three days of age. It is, therefore, a good plan to sex the litter and destroy the surplus on the third day. The external organs of both sexes of the new-born rabbit have much the same appearance, and a special technique is required for identifying the sex at an early age. Good eyes and light are necessary. In order to prevent the persistent wiggling of the small animal, it must be restrained firmly, yet gently. Place the little rabbit on its back in the left palm, with its head extended towards the heel of the hand, using the index finger to press the tail back and down, and the thumb of the left hand and index finger and thumb of the right hand to manipulate the sex parts. Press down on the sexual organ gently, but with sufficient pressure to expose the reddish mucous membrane. In the case of the buck, the mucous membrane can be made to protrude sufficiently to form a circle; in the case of the doe it will protrude and form a slit that will have a slight depression at the end next to the rectum. If one has had experience in sexing young at weaning time, it would be a good plan to practise with several at about three weeks of age, and with this added experience it will be easier to sex the three-day old rabbits. Sexing should not be practised on the same animals at short intervals, because the repeated irritation of the tender parts may be detrimental."

* *Vet. Med.* 1943, xxxviii, 265.

XUM

THE EFFECTS OF VARIOUS INTRAVENOUS INJECTIONS ON THE HORSE*

By STEPHEN J. ROBERTS, D.V.M., M.S.
Assistant professor, Department of Medicine, Obstetrics and Ambulatory Clinic, New York State Veterinary College, Ithaca, New York.

INTRAVENOUS therapy is commonly and successfully used in the treatment of many diseases of horses and other animals. Most of the experimental work on the effects of intravenous injection of drugs in both the human and veterinary fields has been done on small experimental animals, such as cats and dogs. Knowledge thus obtained was then applied to treating human beings and larger domestic animals. This is understandable, as the larger domestic animals, such as the horse, are relatively high in value and difficult to secure and maintain in large numbers for experimental purposes. Therefore, our knowledge of intravenous medication in horses is based mainly on experiments with small animals and with the actual experience of the practitioner treating horses in the field. This leaves a wide gap in our knowledge of the specific effects on the horse's blood stream and body of many of the more common drugs given intravenously.

In endeavouring to lessen this breach, more than 200 experiments with 20 intravenous drugs and materials were made on 69 horses. The horses used in these experiments were obtained by the Kansas State Veterinary School for use in operative surgical exercises. Most of the horses were aged or unable to work, due to some chronic, incurable condition, but the majority were quite strong and vigorous, making good experimental subjects.

Methods

Before and after the intravenous injections, the physical reactions of the horses, including the pulse, respiration, temperature and any unusual symptoms, were noted.

Special attention was given to the effects of the injections on the circulatory system, including: examination of the blood for hæmoglobin values (Haden-Hauser method), hæmolysis, red and white cell counts, specific gravity and total protein determinations (Kagan proteinometer), and an occasional blood calcium determination made by the Kramer-Tisdall method.

The influence of the various injections on the coagulability of blood was also noted. Since horse blood has normally a rather long coagulation time (eleven and one-half minutes, Dukes), intravenous injections that would hasten the clotting time would be valuable in cases of accidental or surgical hæmorrhage. It was recognised that there is no absolutely accurate clinical or laboratory check on the coagulation time since so many factors are involved. However, the capillary pipette method was adopted. After running a series of five coagulation times on each of six normal control horses, it was determined that the average

* Summary of thesis presented as partial requirement for the Master of Science degree at Kansas State College, 1942. Presented before the Section of Surgery and Obstetrics at the seventy-ninth annual meeting of the American Veterinary Medical Association, Chicago, August 24-27, 1942.

greatest decline in coagulation time of the control horses was 37.3 per cent. This was based on the average coagulation time before the injection and the average greatest decline in coagulation time after the injection.

Urine examinations were made in some of the experiments, and these included: specific gravity determination by the urinometer; the reaction as determined by litmus paper; albumin determination by the Fish picro-aceto-glycerol test; sugar determination by the Benedict test; and the microscopic examination of the sediment from the centrifuged urine sample.

The intravenous solutions and fluids were injected into the jugular vein of the horses through a 12 or 14-gauge needle by means of gravity flow. The air or oxygen injections were made by gradually filling the gas-filled flask with water and forcing the gas into the vein through an intravenous needle.

Conclusions

These conclusions were based on over 200 intravenous injections with 20 separate materials given to 69 horses.

(1) Small amounts of air or oxygen injected into the venous circulation were harmless, but small amounts of air injected into the arterial circulation caused severe reactions.

(2) The symptoms produced by the intravenous injection of large amounts of air were, primarily, cardiac and respiratory embarrassment, together with nervous symptoms secondary to a drop in the aortic pressure.

(3) Extremes in rates in injection, temperatures and amounts of physiological saline solutions injected had slight clinical effects on the horse.

(4) The normal horse could tolerate large quantities of hypotonic solutions intravenously, but amounts over 4,000 c.c. regularly produced a temporary hæmolysis of the blood and hæmoglobinuria.

(5) Following the hypertonic sodium chloride injections, an increased peristalsis was noted, together with a definite decline in the coagulation time of the blood.

(6) Sodium citrate solutions injected intravenously caused a definite decline in the coagulation time, and large injections produced symptoms characteristic of acute calcium deprivation.

(7) Lang's solution caused a marked drop in the coagulation time, with an increase in peristalsis, and when it was injected rapidly in large amounts it produced symptoms characteristic of acute calcium deprivation.

(8) Intravenous injections of 100 to 200 c.c. of a 5 per cent. oxalic acid solution lowered the coagulation time, but produced dangerous toxic effects on the circulatory and excretory systems.

(9) Magnesium sulphate solutions injected intravenously caused a definite decline in the coagulation time, but were poor anæsthetic solutions, as the anæsthetic dose was too near the fatal dose.

(10) Chloral hydrate was occasionally toxic for certain old, debilitated horses, especially if the animal struggled during the period of narcosis or anæsthesia.

(11) Chloral solutions produced a definite decline in the coagulation rate and in the body temperature.

(12) Following calcium gluconate injections, there was a definite decline in the coagulation time; large amounts could be injected rapidly in horses without producing marked clinical symptoms.

(13) Formalin (8 to 16 c.c.), in various concentrations with distilled water, was relatively non-toxic and caused a marked, rapid decline in the coagulation time and a slight, temporary increase in the red blood cell count.

(14) Moderate or large doses of formalin, injected rapidly, produced clinical symptoms similar to those of histamine or foreign-protein shock in the horse.

(15) Gelatin solutions produced a marked, rapid drop in the coagulation time after the injection, with no development of unusual symptoms.

(16) Injections of dilute hydrochloric acid did not produce leucocytosis in normal horses, and failed to produce other observable circulatory or clinical effects.

(17) Blood transfusions may be given at wide ranges of temperature, from 32 to 138 degrees F., without ill-effects, while the injection of overheated blood produced definite symptoms of foreign-protein shock.

(18) Tests on 69 normal, experimental horses showed an average, slight to definite, increase in the coagulation time, respiration rate and pulse rate, and a noticeable decline in the red blood cell count and hæmoglobin values when compared with the averages of other workers. These differences might possibly be due to the fact that the horses in general were thin and aged.

(19) The circulatory system of the horse is capable of handling large volumes and strong concentrations of many drugs and materials without permanent injury to the system or to the body.

(20) There is much work yet to be done on the subject of intravenous injections and their effects on the horse.

Acknowledgments

Recognition and appreciation are given to Drs. E. E. Leasure, E. J. Frick, R. P. Link and W. W. Thompson for valuable aid, counsel and laboratory facilities freely offered.

Thirty-four references are quoted.

GOLD COAST COLONY

Report of the Department of Annual Health, 1942-43.
Crown Agents for Colonies, 4, *Millbank*, *S.W.*1. 1*s.*

THE staff of the department consists of one director, seven veterinary officers, forty-two veterinary assistants and one laboratory assistant.

The war has made the Gold Coast dependant on its own livestock. Disease control shows a good record, but animal husbandry suffers greatly from poor water supplies and also the want of agricultural education of the people.

Reopening of the frontiers has only appreciably affected the inflow of sheep. Their neighbours have the same problems with reference to food supply and can export few of the other species. The northern territories are the main livestock areas and practically all the professional staff are located there. The department works in the closest collaboration with the Department of Agriculture. Lack of water appears to be a major problem, a strange feature in a country which averages forty-five inches rainfall per year. Large-scale schemes for the conservation of water are evidently necessary.

With reference to the control of disease since the advent of a standardised serum, the mortality from rinderpest has been reduced to less than 1 per cent. 40,000 young cattle were immunised permanently. The work of the veterinary officer does not meet with universal approval, for we find that in one district they are cheered, in another, where they were equally successful, booing was the reward. It would appear that the reactions of primitive people to modern methods are not always all that could be desired. The opening of frontiers led to outbreaks of pleuro-pneumonia. These were kept under control by vaccination. Over 250,000 doses were produced. Foot and mouth disease occurs, but its effects are not serious in the more primitive African animal.

It has been found that the addition of 0.02 acriflavine to rinderpest serum, as advocated by S. C. J. Bennett, has given good results. Since the method was adopted there has been no case of deterioration or contamination. Considering the small staff, the record of the work of the Pong-Tamali Laboratory makes remarkable reading. The output of vaccine is stupendous. Research has also been conducted in pneumonia, tsetse eradication and parasitic disease. Excellent work has also been carried out on livestock improvement. Great advances in milk production are recorded, and in the marketing of animals and animal products.

The report is a record of sound work, of which the service may be proud.

UGANDA PROTECTORATE

Annual Report of the Veterinary Department for Year ended December 31, 1942.

Stock and stock products are in ever-increasing demand. Demand has exceeded supplies. Additional avenues for disposal have been opened up and any fears of overstocking have been dispelled. 1942 has been a prosperous year for stock owners.

Rinderpest appeared and over 80,000 head were immunised with goat virus and the disease was eliminated from all areas except the game preserve and the sleeping sickness country.

There were sporadic outbreaks of anthrax, black quarter, foot and mouth disease and trypanosomiasis. There were also occasional cases of contagious pleuro-pneumonia.

Investigations have been conducted to determine the relationship of natural and artificial feeding to milk yields. Weight increase tests were conducted with the same object in view. As a result of a propaganda campaign in the case of

XUM

stock, a marked improvement is already evident. Pig rearing, a new industry, is going ahead. Ghee production is now sufficient to supply the Polish refugee camps and amounts to about 9,000 lb. per month. 60,000 lb. of butter have been produced, mainly for the military authorities.

The provision of stock markets and trek oxen, and of cattle to supply the meat needs of both military and civil authorities, has been a big problem for the veterinary services. In two areas as many as 120,000 head of stock passed through the markets. Transport has been a serious problem, many animals of necessity being moved by road. 13,073 were moved in this manner to the Malikisi collecting camp.

Export of hides and skins amounted to 1,933 tons of hides and 632,134 goatskins to a total value of £185,150. This reflects the general agricultural prosperity, for in value it shows an increase of £46,000 over the previous year. Efforts have been made to eliminate sun-dried hides and concentrate on frame-dried, and the general quality has been improved thereby.

The tsetse fly is still a problem. A new fly belt has appeared within recent years, the tsetse *G. Pallidipes* being concerned, and many square miles of valuable grazing has been denied to this district. This is all the more serious, for, with the development of intensive farming and close cultivation, these outlying grazing areas can ill be spared. Investigations are being conducted in collaboration with the Senior Medical Entomologist. Accurate surveys are being made and so far the methods adopted are extremely promising.

The work of the veterinary laboratory has been somewhat restricted, owing to depletions of staff. Routine work has been adequately dealt with and the Veterinary School kept going. Research has progressed on a small scale.

Meat inspection at Entebbe abattoir is carried out by a member of the laboratory staff.

Research in chemotherapy and *T. Congolense* infections have been the main features. M & B 736 is now recognised as the chemotherapeutic agent *par excellence* for tick fever in dogs. It has also proved efficient in a few cases of redwater in calves. In *T. Congolense* infections M & B 991 gives good promise.

The study of the pathology and blood changes in *T. Congolense* infections has been continued. Attempts to immunise cattle with strains of *T. Congolense* after passage through pigs and mice have been made. The immunising properties of serum from recovered cattle and pigs has been the subject of investigations. So far, results have been inconclusive.

With regard to rinderpest, further attempts have been made to establish the virus in small laboratory animals. Rinderpest virus has been preserved by freezing and drying. It was found that the virus lost its infecting power after ten months at approximately 0-5 deg. Cent.

Amongst the Miscellaneous Diseases (Section W) investigations have been carried out on the relationship of tick typhus in man and *Rickettsia canis* infections in dogs.

An interesting atheromatous condition of the aorta in cattle slaughtered at Kampula has been observed. In the nodules, which contain a caseous material, fine delicate worms have been noted. They appear to be *Anchocerca Sp.*

Under the heading Animal Husbandry there are reports of the establishment of good permanent pasture, supplementary feeding of transport bullocks and stall feeding, which is so necessary in highly populated areas.

The relationship between low butter-fat content of milk and abnormally low blood prosphorus has been investigated. It has been found that pastures may be improved by grazing donkeys with cattle.

At the Veterinary School three students passed their final examination. Difficulties have been encountered owing to the war-time reduction of the professional staff, but the standard of teaching has been maintained.

The report is a comprehensive one, denoting steady progress in a wide field. Shortage of staff would appear to be the only defect of an excellent service.

Reviews

The Living Soil. By E. B. BALFOUR. Faber & Faber, Ltd., 24, Russell Square, London, W.C.1. Price 12s. 6d.

THE emergencies of war have drawn attention to agriculture and the soil in a way such as could never have been attained in the easy days of peace. Agriculture is the basic industry of all countries, for life cannot continue without food, and food materials, animal and vegetable, all have their origins in the soil. "Human health is bound up with the health of farm produce, whether animal or vegetable." (The primary factor in health and resistance to disease is good nutrition.) A healthy soil means healthy crops and animal life, and this is the author's theme. In this most interesting book the author shows how, in her opinion, such a beneficial state of affairs may be attained.

It is a book which arrests and holds one's interest from start to finish, and although the author's outlook is somewhat unconventional, one cannot help but be impressed by his arguments at the time of reading and to ponder over them long after the book is laid aside. It may be that she is correct. Most certainly her ideas should be investigated.

Practical Animal Husbandry. By W. C. MILLER and E. D. S. ROBERTSON. (3rd Edition.) 496 pages with illustrations. Published by Messrs. Oliver and Boyd, Edinburgh. Price 20s.

THIS very useful and practical work well deserves the attention of veterinary surgeons and veterinary students. This new edition has been considerably enlarged, and, as the authors say in the preface, "has been revised and in part rewritten to bring it into conformity with modern ideas and practice." It now consists of 38 chapters with four appendices, a list of the publications consulted and an index. A glance at the table of contents indicates the great variety of the subjects covered. To refer to a few only, the following will serve as examples: "Manipulation and Restraint of Animals"; "Stable and Other Vices"; "Description and Identification of Cattle"; "Management of Brood

XUM

Mares"; "Shoeing"; "Dentition and Ageing"; "Herd Management"; "Flock Management"; "Pig Management"; "Poultry Management"; "The Essentials of Rabbit Husbandry"; "Fur Farming, apart from Rabbits." The appendices consist of various Acts and Orders relating to animals, e.g., Horse Breeding Act, 1918; The Warble Fly (Dressing of Cattle) Order of 1935. There is also a useful set of tables in which are given details concerning the phases of reproduction in a variety of animals, including all the domestic animals as well as small laboratory and wild animals.

The whole work is well written, in an easy readable style, and the illustrations are highly descriptive. In spite of the fact that so many aspects are covered, there is little in the subject of animal husbandry to which reference is not made. A criticism might be that more attention is given to subjects dealing with the horse than with other animals. Be this as it may, there is no doubt that in this new edition we have a book which ranks high in the general subject of animal husbandry, especially from the practical angle.

We recommend the volume to our readers and feel that they will find it a convenient reference for many of the everyday questions arising in their general work. Veterinary students will find it of much value in their studies.

Diseases of Breeding Ewes. By ALLAN LESLIE, F.R.C.V.S. 147 pages with illustrations. Published by Messrs. Whitcombe and Tombs, Ltd. Price 9s. 6d.

THERE has recently come to our notice a volume with the above title. It is No. 1 of "A Practical Series on Feeding, Management and Diseases of Ewes and Lambs," and is intended mainly for the use of practical farmers and of students of agriculture. The book is written in simple, non-technical language and gives a clear exposition of much useful information concerning causes, nature and control of the important diseases of breeding ewes. The volume is divided into three sections, viz.: Diseases and Disorders of Pregnancy; Diseases and Disorders of Parturition; Diseases and Disorders of Lactation; together with an index.

The various subjects are dealt with in a manner likely to prove of interest to the readers for whom they are intended. Thus, for example, in the first section a description of the various organs of reproduction forms an introduction to the general subject of disease affecting them. The reader thus understands the function and the nature of the various organs and tissues before reading of diseases. The illustrations are good and help further to enlighten the reader on many points.

The diseases dealt with vary considerably and reference is made to much of the latest information from different parts of the world.

We have no hesitation in recommending this book to the class of reader for whom it was written. As a simple explanation of diseases of breeding ewes, veterinary surgeons will find it well worth recommending to practical sheep farmers and shepherds. We are sometimes asked for the name of a book dealing with this subject. A volume such as this, is the answer.

Obituary

LT.-COL. T. DUNLOP YOUNG, OB.E., M.R.C.V.S., D.V.S.M.

Our readers will receive with deep regret the news of the death of Lt.-Col. T. Dunlop Young. Although he has not been much in the public eye during recent times, largely due to his long illness, he was formerly a very well-known figure in veterinary circles. His career is full of interest and one to be admired. His early struggles to obtain the means to enter the veterinary profession and his ultimate success in doing so have been recounted elsewhere. Suffice it to say that, despite disadvantages which might well have deterred many a brave young man, he surmounted them and became a leading member of the profession and an authority on the various aspects of meat inspection. His early experiences before he became a veterinary surgeon stood him in good stead and his career clearly reflects the advantages derived from them. His long association with the Corporation of the City of London gave him insight into meat marketing and inspection problems, and it soon became apparent throughout many parts of the world that he was master of his subject. His experience and ability were recognised in different countries, for, in addition to visiting most of the large meat exporting countries while still in harness, on his retirement he was appointed Veterinary Adviser in London to a number of governments of the countries he had already visited.

Col. Young was a man of many parts and we knew him in some of them. His interest in military matters was shown by his association with the Territorial Army before the Great War. During the war much of his time was spent as officer commanding the Veterinary Hospital at St. Omer. For his work in the Army he was mentioned in despatches and was awarded the O.B.E.

We knew him also as a writer. His contributions to veterinary periodicals, including this Journal, rank high. He will also be remembered for his editing of the text-book on Meat Inspection, by Ostertag. These works will remain as a reminder to us and to future generations of a noble, kindly, veterinary surgeon who rose high in the ranks of his profession and who left his profession better than he found it, because of his own efforts.

MR. S. H. NYE, F.R.C.V.S.

Many professional friends will learn with regret of the sudden death of Mr. Sidney Herbert Nye, F.R.C.V.S., who has practised at Chapman Street, E.1, and formerly at Bow, E., for about fifty years, which took place at the age of seventy-three.

Following a service at St. Mary's Church, Loughton, Essex, the burial took place at St. John's Cemetery, Loughton. Many friends attended the funeral service and numerous floral tributes were sent as a last token of respect. A son, Mr. Sidney S. Nye, M.R.C.V.S., is succeeding his father in the practice.

XUM

CORRIGENDA.

In our issue of November, 1943, the review of Banham's "Veterinary Biology" 7th edition should have read, Banham's "Veterinary Posology."

Publishers' Notices

Copy of advertisements should be in the hands of the publishers—Baillière, Tindall and Cox—not later than the 1st of the month, if proof is required.

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INDEX TO AUTHORS

JANUARY TO DECEMBER, 1943

A

Adamson, J.—Notes on the Treatment of Actinobacillosis by Intravenous Medication with Sodium Iodide, 165.
Aldis, D. H.—Ascarides in the Pig: Interesting Sequelæ, 197.

B

Balfour, E. B.—The Living Soil, 319. (Review.)
Bartlett, D. E.—(See Hammond, D.M.)
Barton, W. F.—Some Animal Casualties by Enemy Action, 53.
Beeson, W. M., Fence, J. W., and Holm, G. C.—Urinary Calculi in Sheep, 247. (Abstract.)
Bingham, Myra L.—Parasitic Aneurisms in a Young Foal, 245.
Blaxter, K. L.—The Normal Variation in the Heart Rate of Dairy Cows, 2.
Bradley, O. Charnock.—Topographical Anatomy of the Dog, 153. (Review.)
Braude, R.—Toxic Effects in the Feeding of Cocoa Meal to Pigs, 302.
Bruner, D. W.—(See Dimock, W. W.)

C

Campbell, J. G., and Sloan, J. E. N.—A Possible New Species of Trematode Parasite in the Kidneys of the King Penguin, 291.
Clay, H. H.—The Sanitary Inspector's Handbook, 89. (Review.)
Cross, H. E.—Notes on Rabies, Anthrax, Tabanidæ and Foot-and-Mouth Disease, 183.

D

Dimock, W. W., Edwards, P. R., and Bruner, D. W.—Equine Virus Abortion, 27. (Abstract.)
Dlugosz, H.—Foot-and-Mouth Disease in Man, 175. (Abstract.)
Dowgiallo, J.—Food and Poison Gas—III, 12.
Doyle, T. M.—The Value of the Tuberculin Test in Cattle affected with Extensive Lesions of Tuberculosis, 64.
Dugal, E. A.—Observations of Leptospirosis in California Dogs, 30. (Abstract.)
Dukes, H. H.—The Physiology of Domestic Animals, 31. (Review.)
Duncan, A. C.—Role of the Expert Witness, 113.

E

Edwards, P. R.—(See Dimock, W. W.)
Eveleth, D. F.—(See Eveleth, M. W.)
Eveleth, M. W., and Eveleth, D. F.—Johne's Disease of Goats, 274. (Abstract.)

F

Fence, J. W.—(See Beeson, W. M.)
Forbes, G. S.—Notes on Two Unusual Cases, 178. (Correspondence.)
Formston, C.—(See Wright, J. G.)

G

Goss, H.—(See Hart, G. H.)
Guilbert, H. R.—(See Hart, G. H.)

H

Hammond, D. M., and Bartlett, D. E.—The Distribution of Trichomonas fœtus in the Preputial Cavity of Infected Bulls, 270. (Abstract.)
Hanson, L. E.—Ear Markings of Pigs—A Workable System, 297. (Abstract.)
Hare, T.—Dung and Droplets, 197.
Harman, J. B.—Mummified Fœtus—Twin to Normal Foal, 175.
Harman, J. B.—Schistosomum Reflexum Twin to Normal Calf, 174.
Harman, J. B.—Sequel to Ulcerative Cystitis of the Cow's Bladder, 173.
Hart, G. H., Goss, H., and Guilbert, H. R.—Vitamin A Deficiency not a Cause of Joint Lesions in Horses, 226. (Abstract.)
Hignett, S. L.—(See Stableforth, A. W.)
Holm, G. C.—(See Beeson, J. W.)
Howard, Sir Albert.—A New Policy for Veterinary Science, 74.
Hudson, R.—Torsion of the Uterus, 54.

I

Ivy, A. C.—The Treatment of Shock in the Dog, 81. (Abstract.)

J

Jennings, W. E.—(See Jones, T. C.)
Jones, T. C., and Jennings, W. E.—Equine Influenza and Related Respiratory Diseases in Horses—Epizootiological and Clinical Observations, 272. (Abstract.)

K

Kerr, W. R.—Trichomoniasis in the Bull—II, 4.
Kerr, W. R.—Trichomoniasis in the Cow, 95, 145.
King, W. S., and Moller, A. W.—Experiences of Air Bombardment in an Urban Area, 258.
Kirk, Hamilton.—Chemotherapy, 35, 70.
Kirk, Hamilton.—The Ovary—Hormone Therapy, 137.
Kirk, Hamilton.—Promanide (Promin) in the Treatment of Tuberculosis, 156.
Klein, L. A.—Therapeutic Control of Lactation, 56. (Abstract.)

L

Lawfield, F. C.—(See Townsend, C. W.)
Leese, A. S.—Parasitic Aneurism in Foals, 276. (Correspondence.)
Leslie, A.—Diseases of Breeding Ewes, 320. (Review.)
Leys, D. G.—Abortus Fever, 119. (Abstract.)
Linton, R. G., and Williamson, G.—Animal Nutrition and Veterinary Dietetics, 299. (Review.)

XUM

Lishman, T. — Veterinary Jurisprudence, 151, 161, 193.
von Lustig-Lendva, E.—Displacement of Os Calcis and Astragalus in a Bitch, 244.
von Lustig-Lendva, E.—Multiple Sarcomatosis in Spaniel Bitch, 196.
von Lustig-Lendva, E.—Nervous Distemper in the Dog, 172.

M

Marcos, Z.—Distemper in Dogs, 215.
Marcos, Z.—Pigeon Pox, 219.
Martin, F. E.—Treatment of Mastitis with Tyrothricin, 202. (Abstract.)
McCunn, J.—The Veterinary Surgeon and Livestock Insurance, 110.
McKay, W. M.—Congenital Tuberculosis in Bovines, 47.
McKelvey, D.—Lead Poisoning, 25.
Miller, W. C., and Robertson, E. D. S.—Practical Animal Husbandry, 319. (Review.)
Moller, A. W.—(See King, W. S.)
Morgan, E.—A New Policy for Veterinary Science, 126. (Correspondence.)
Morgan, E.—The Origin of Spread of Infection, 203. (Correspondence.)
Morgan, E.—Phlebotomy *versus* Neoplasms, 179. (Correspondence.)

P

Phillips, R. W.—Seasonal Variation in the Semen of Bulls, 225. (Abstract.)
Picton, L. J., and Picton, W. H. A.—Talk about Milk, 132.
Picton, W. H. A.—(See Picton, L. J.)

R

Roach, R. W.—(See Stableforth, A. W.)
Roberts, S. J.—The Effect of Various Intravenous Injections on the Horse, 314. (Abstract.)
Runge, S.—Testicular Grafting in Domestic Animals, 231.

S

Sankaranarayan, N. S.—(See Sreenivasan, M. K.)
Savage, A.—Rupture of Horse's Spleen by a Kick, 196.
Sreenivasan, M. K., and Sankaranarayan, N. S.—Spirochætosis of Fowls in India, 208, 236, 255.
Senior, M.—Eversion of the Urinary Bladder, 311.
Senior, M.—Fistula of a Lymphatic Duct, 312.
Senior, M.—Pyelonephritis, 312.
Simmons, R. J.—A Colonial Veterinary Department in Peace and in War, 107.
Sloan, J. E. N.—(See Campbell, J. G.)
Speed, J. G. — The Thoraco-Acromial Artery, 163.
Stableforth, A. W., Hignett, S. L., and Roach, R. W.—Sulphonilamide in the Treatment of Group C Streptococcus Infections: Mouse Experiments, 42.
Stamp, J. T.—Congenital Atresia of the Ileum and Colon, 308.
Stewart, P. D.—Handling Horses, 90. (Review.)
Sykes, F.—Will there be a Second Black Death? 283.

T

Taylor, J. A.—An Abnormally Developed Pronator Teres Muscle in the Horse, 310.
Templeton, G. S.—An Opportunity for Rabbit Breeders, 313. (Abstract.)
Townsend, C. W. and Lawfield, F. G. C.—Complications due to Adhesions at a Cryptorchid Operation, 269.
Townsend C. W., and Lawfield, F. G. C.—An Outbreak of Anthrax, 190.
Tuckey, R. E. S.—Nicotine Sulphate and Warble Fly, 179. (Correspondence.)
Tutt, J. B.—A Case of Double Intussusception in the Dog, 296.
Tutt, J. B.—A Report on Two Cases of Carcinoma on the Membrana Nictitans in Dairy Cows, 295.
Tutt, J. B.—Ruptured Vagina in the Heifer, 224.
Tutt, J. B.—Tetanus in the Dog, 296.
Tutt, J. B.—An Unusual Type of Developmental Error in the Bovine, 244.
Tutt, J. B.—An Unusual Vaginal Fibroid in the Bitch, 224.

W

Wahby, W. M.—Gleanings from an Egyptian Abattoir, 189.
Walker, C. M. M.—Observations on Diagnosis, Poisoning and Electrocution, 167.
Walsh, F. E.—Dysfunction of the Ovary, 87. (Abstract.)
Ware, F.—A Plea for a Broader System of Veterinary Education with Special Reference to Indian Conditions, 158.
Watson, Chalmers. — British Farming—Nutrition Research, 279.
Weighton, C.—Stilbœstrol Dipropionate for the Removal of a Mummified Fœtus, 125.
Wentworth, Baroness.—Thoroughbred Inheritance and Mathematics, 9.
Wilde, J. K. H.—A Case of High or Anterior Epidural Anæsthesia in a Bull, 294.
Williamson, G.—(See Linton, R. G.)
Williamson, G.—Feeding the Backyard Pig, 18.
Wright, J. G., and Formston, C.—Entropion in Newly-born Lambs, 188.

GENERAL INDEX

JANUARY TO DECEMBER, 1943

A

Abattoir, Egyptian, Gleanings from an, 189.
Abnormally Developed Pronator Teres Muscle in the Horse, 310.
Abortion, Equine Virus, 27. (Abstract.)
Abortus Fever, 119. (Abstract.)
Abstracts of Current Literature, 27-31, 56-58, 81-89, 119-125, 175-178, 202-203, 225-228, 247-252, 270-275, 297-299, 313-319.
Actinobacillosis, Notes on the Treatment of, by Intravenous Medication with Sodium Iodide, 165.
Adhesions at a Cryptorchid Operation, Complications due to, 268.
Air Bombardment in an Urban Area, Experiences of, 258.
Anæsthesia, Epidural in a Bull, A Case of High or Anterior, 294.
Aneurisms, Parasitic, in the Young Foal, 245, 276.
Animal Casualties by Enemy Action, Some, 53.
Animals, Domestic, Testicular Grafting in, 231.
Anthrax, An Outbreak of, 190.
——, Rabies, Tabanidæ and Foot-and-Mouth Disease, Notes on, 183.
Artery, The Thoraco-acromial, of the Dog, 163.
Ascarides in the Pig: Interesting Sequelæ, 197.
Astragalus and Os Calcis, Displacement of, in a Bitch, 244.
Atresia, Congenital, of the Ileum and Colon, 308.

B

Bitch, An Unusual Vaginal Fibroid in the, 224.
——, Displacement of Os Calcis and Astragalus in a, 244.
——, Spaniel, Multiple Sarcomatosis in, 196.
Black Death? Will there be a Second, 283.
Bladder, Cow's, Sequel to Ulcerative Cystitis of the, 173.
——, Urinary, Eversion of the, 311.
Bovine, An Unusual Type of Developmental Error in the, 244.
Bovines, Congenital Tuberculosis in, 47.
Breeders, Rabbit, An Opportunity for, 313. (Abstract.)
British Farming: Nutrition Research, 279.
Bull, A Case of High or Anterior Epidural Anæsthesia in a, 294.
——, Trichomoniasis in the, 4.
Bulls, Infected, The Distribution of Trichomonas Fœtus in the Preputial Cavity of, 270. (Abstract.)
——, Semen, Seasonal Variation in the, of, 225. (Abstract.)

C

Calculi, Urinary, in Sheep, 247. (Abstract.)
Calf, Normal, Schistosomum Reflexa Twin to, 174.
Carcinoma of the Membrana Nictitans in Dairy Cows, A Report on Two Cases of, 295.
Case of Double Intussusception in the Dog, A, 296.
—— of High or Anterior Epidural Anæsthesia in a Bull, A, 294.
Chemotherapy, 35, 70.
Cocoa Meal, Toxic Effects in the Feeding of, to Pigs, 302.
Colon and Ileum, Congenital Atresia of the, 308.
Colonial Veterinary Department in Peace and in War, A, 107.
Complications Due to Adhesions at a Cryptorchid Operation, 268.
Congenital Atresia of the Ileum and Colon, 308.
Congenital Tuberculosis in Bovines, 47.
Control, Therapeutic, of Lactation, 56. (Abstract.)
Co-ordinated Trials with Phenothiazine Against Nematodes in Lambs, 248. (Abstract.)
Cow, Trichomoniasis in the, 95, 145.
Cow's Bladder, Sequel to Ulcerative Cystitis of the, 173.
——, Dairy, A Report on Two Cases of Carcinoma of the Membrana Nictitans in, 295.
——, Dairy, The Normal Variation in the Heart Rate of, 2.
Cryptorchid Operation, Complications Due to Adhesions at a, 268.
Cystitis, Ulcerative, of the Cow's Bladder, Sequel to, 173.

D

Dairy Cows, The Normal Variation in the Heart Rate of, 2.
Deficiency, Vitamin A, not the Cause of Joint Lesions in Horses, 226. (Abstract.)
Developmental Error, An Unusual Type of, in the Bovine, 244.
Diagnosis, Poisoning and Electrocution, Observations on, 167.
Displacement of Os Calcis and Astragalus in a Bitch, 244.
Distemper in Dogs, 215.
——, Nervous, in the Dog, 172.
Distribution of Trichomonas Fœtus in the Preputial Cavity of Infected Bulls, The, 270. (Abstract.)
Dog, A Case of Double Intussusception in the, 296.
——, Nervous Distemper in the, 172.
——, Tetanus in a, 296.
——, Treatment of Shock in the, 81. (Abstract.)
Dogs, Distemper in, 215.
——, Observations of Leptospirosis in California, 30. (Abstract.)
Domestic Animals, Testicular Grafting in, 231.

XUM

Droplets and Dung, 197.
Dung and Droplets, 197.
Dysfunction of the Ovary, 87. (Abstract.)

E

Editorials :—
Animal Health, 181.
Chemotherapy, 33.
Further Progress in 1943, 301.
Journal of Comparative Pathology and Therapeutics, 34.
Milk Policy, 205.
New Treatments, 155.
Origin and Spread of Infection, 129.
Phenothiazine as an Anthelmintic, 229.
Research Work and its Field Application, 277.
Trichomoniasis, 93.
Veterinary Profession and Books, 278.
What Sort of Feople do They Think We Are? 253.
1943, 1.
Effects of Various Intravenous Injections on the Horse, The, 314. (Abstract.)
Electrocution, Diagnosis and Poisoning, Observations on, 167.
Enemy Action, Some Animal Casualties by, 53.
Entropion in Newly-born Lambs, 188.
Epidural Anæsthesia in a Bull, A Case of High or Anterior, 294.
Equine Influenza and Related Respiratory Diseases in Horses, 272. (Abstract.)
—— Virus Abortion, 27. (Abstract.)
Eversion of the Urinary Bladder, 311.
Experiences of Air Bombardment in an Urban Area, 258.
Expert Witness, The Role of, 113.

F

Farming, British—Nutrition Research, 279.
Feeding of Cocoa Meal to Pigs, Toxic Effects of, 302.
—— the Backyard Pig, 18.
Fever, Abortus, 119. (Abstract.)
Fibroid, Vaginal, An Unusual, in the Bitch, 224.
Fistula of a Lymphatic Duct, 312.
Foal, Normal, Mummified Fœtus, Twin to, 175.
——, Parasitic Aneurisms in the, 245, 276.
Fœtus, Mummified, Stilbœstrol Dipropionate for the Removal of a, 125.
——, Mummified, Twin to Normal Foal, 175.
Food and Poison Gas, 12.
Foot-and-Mouth Disease in Man, 175. (Abstract.)
——, Rabies, Anthrax and Tabanidæ, Notes on, 183.
Fowls in India, Spirochætosis in, 208, 236, 255.

G

Gleanings from an Egyptian Abattoir, 189.
Goats, Johne's Disease in, 274. (Abstract.)
Grafting, Testicular, in Domestic Animals, 231.

H

Heart Rate in Dairy Cows, The Normal Variation of, 2.
Heifer, Ruptured Vagina in the, 224.
Hormone Therapy and the Ovary, 137.
Horse, An Abnormally Developed Pronator Teres Muscle in the, 310.
——, The Effects of Various Intravenous Injections on the, 314. (Abstract.)
Horses, Equine Influenza and Related Respiratory Diseases in, 272. (Abstract.)
——, Vitamin A Deficiency Not a Cause of Joint Lesions in, 226. (Abstract.)
Horse's Spleen, Rupture of, by a Kick, 196.

I

Ileum and Colon, Congenital Atresia of, 308.
Infection, The Origin and Spread of, 203.
Infectious Streptococcus, Sulphanilamide in the Treatment of Group C and Group G, 42.
Influenza, Equine, and Related Respiratory Diseases in Horses, 272. (Abstract.)
——, Swine, 250. (Abstract.)
Injections, Intravenous, The Effects of Various, on the Horse, 314. (Abstract.)
Insurance, Livestock, and the Veterinary Surgeon, 110.
Intravenous Injections, The Effects of Various, on the Horse, 314. (Abstract.)
—— Medication with Sodium Iodide, Notes on the Treatment of Actinobacillosis by, 165.
Intussusception, Double, in the Dog, A Case of, 296.

J

Johne's Disease of Goats, 274. (Abstract.)
Joint Lesions in Horses, Vitamin A Deficiency Not a Cause of, 226. (Abstract.)
Jurisprudence, Veterinary, 151, 161, 193.

L

Lactation, Therapeutic Control of, 56. (Abstract.)
Lambs, Co-ordinated Trials with Phenothiazine Against Nematodes in, 248. (Abstract.)
——, Newly-born, Entropion in, 188.
Lead Poisoning, 25.
Leptospirosis in California Dogs, Observations of, 30. (Abstract.)
Livestock Insurance and the Veterinary Surgeon, 110.
Lymphatic Duct, Fistula of a, 312.

M

Man, Foot-and-Mouth Disease in, 175. (Abstract.)
Mastitis, Treatment of, with Tyrothricin, 202. (Abstract.)
Membrana Nictitans in Dairy Cows, A Report of Two Cases of Carcinoma of the, 295.
Milk, Talk About, 132.
Multiple Sarcomatosis in Spaniel Bitch, 196.
Mummified Fœtus, Stilbœstrol Dipropionate for the Removal of a, 125.
——, Twin to Normal Foal, 175.
Muscle, Pronator Teres, in the Horse, An Abnormally Developed, 310.

N

Neoplasms *versus* Phlebotomy, 179.
Nematodes in Lambs, Co-ordinated Trials with Phenothiazine Against, 248. (Abstract.)
Nervous Distemper in the Dog, 172.
New Policy for Veterinary Science, A, 74, 126.
Nicotine Sulphate and Warble Fly, 179.
Notes on Two Unusual Cases, 179.
Nutrition Research: British Farming, 279.

O

Obituary:—
Craig, J. F., 58.
Golledge, H., 61.
Hughes, H. T., 32.
Jackson, Sir R., 252.
Nye, S. H., 321.
Young, Lt.-Col. T. D., 321.
Observations of Leptospirosis in California Dogs, 30. (Abstract.)
Opportunity for Rabbit Breeders, 313. (Abstract.)
Origin and Spread of Infection, 203.
Os Calcis and Astralagus in a Bitch, Displacement of, 244.
Outbreak of Anthrax, An, 190.
Ovary, Dysfunction of the, 87. (Abstract.)
——, The, and Hormone Therapy, 137.

P

Parasite, Trematode, A Possible New Species of, in the Kidneys of the King Penguin, 291.
Parasitic Aneurisms in the Foal, 245, 276.
Penguin, King, A Possible New Species of Parasite Trematode in the Kidneys of, 291.
Phenothiazine Against Nematodes in Lambs, Co-ordinated Trials with, 248. (Abstract.)
Phlebotomy *versus* Neoplasms, 179.
Pig, Ascarides in the: Interesting Sequelæ, 197.
——, Backyard, Feeding the, 18.
Pigs, Toxic Effects of the Feeding of Cocoa Meal to, 302.
Pigeon Pox, 219.
Plea for a Broader System of Veterinary Education, with Special Reference to Indian Conditions, A, 158.
Poison Gas and Food, 12.
Poisoning, Diagnosis and Electrocution, 167.
——, Lead, 25.
Pox, Pigeon, 219.
Promanide (Promin) in the Treatment of Tuberculosis, 156.
Pronator Teres Muscle in the Horse, An Abnormally Developed, 310.
Pyelonephritis, 312.

R

Rabbit Breeders, An Opportunity for, 313 (Abstract.)
Rabies, Anthrax, Tabanidæ and Foot-and-Mouth Disease, Notes on, 183.
Report on Two Cases of Carcinoma of the Membrana Nictitans in Dairy Cows, A, 295.
Respiratory Diseases in Horses, Related, and Equine Influenza, 272. (Abstract.)
Reviews:—
Animal Nutrition and Veterinary Dietetics, 299.
Banham's Veterinary Posology, 300.
Bloodstock Breeder's Review, 228.
Diseases of Breeding Ewes, 320.
Handling Horses, 90.
Jeyes' Animal Book, 127.
Jeyes' Poultry Book, 127.
Physiology of Domestic Animals, 31.
Practical Animal Husbandry, 319.
Sanitary Inspectors' Handbook, 89.
Topographical Anatomy of the Dog, 153.
The Living Soil, 319.
Role of the Expert Witness, 113.
Rupture of Horse's Spleen by a Kick, 196.
Ruptured Vagina in the Heifer, 224.

S

Sarcomatosis, Multiple, in Spaniel Bitch, 196.
Schistosomum Reflexa, Twin to Normal Calf, 174.
Science, Veterinary, A New Policy for, 74.
Seasonal Variation in the Semen of Bulls, 225. (Abstract.)
Semen of Bulls, Seasonal Variation in the, 225. (Abstract.)
Sheep, Urinary Calculi in, 247. (Abstract.)
Shock in the Dog, The Treatment of, 81. (Abstract.)
Sodium Iodide, Notes on the Treatment of Actinobacillosis by Intravenous Medication with, 165.
Spirochætosis in Fowls in India, 208, 236, 255.
Spleen, Horse's, Ruptured by a Kick, 196.
Spread and Origin of Infection, 203.
Stilbœstrol Dipropionate for the Removal of a Mummified Fœtus, 125.
Streptococcus Infections, Sulphanilamide in the Treatment of Group C and Group G, 42.
Sulphanilamide in the Treatment of Group C and Group G Streptococcus Infections, 42.
Swine Influenza, 250. (Abstract.)

T

Tabanidæ, Rabies, Anthrax and Foot-and-Mouth Disease, Notes on, 183.
Talk about Milk, 132.
Testicular Grafting in Domestic Animals, 231.
Tetanus in a Dog, 296.
Therapeutic Control of Lactation, 56. (Abstract.)
Therapy, Hormone, and the Ovary, 137.
Thoraco-Acromial Artery of the Dog, The, 163.
Thoroughbred Inheritance and Mathematics, 9.
Torsion of the Uterus, 54.
Toxic Effects in the Feeding of Cocoa Meal to Pigs, 302.

XUM

Trichomonas Fœtus in the Preputial Cavity of Infected Bulls, The Distribution of, 270. (Abstract.)
Trichomoniasis in the Bull, 4.
—— in the Cow, 95, 145.
Tuberculin Test in Cattle Affected with Extensive Lesions of Tuberculosis, The Value of the, 64.
Tuberculosis, Congenital, in Bovines, 47.
——, The Value of the Tuberculin Test in Cattle Affected with Extensive Lesions of, 64.
——, Treatment of, with Promanide (Promin), 156.
Tyrothricine, Treatment of Mastitis with, 202. (Abstract.)

U

Ulcerative Cystitis of the Cow's Bladder, Sequel to, 173.
Unusual Type of Developmental Error in the Bovine, 244.
Urinary Bladder, Eversion of the, 311.
—— Calculi in Sheep, 247. (Abstract.)
Uterus, Torsion of the, 54.

V

Vagina, Ruptured, in the Heifer, 224.
Vaginal Fibroid in the Bitch, An Unusual, 224.
Value of the Tuberculin Test in Cattle Affected with Extensive Lesions of Tuberculosis, The, 64.
Variation, The Normal, in the Heart Rate of Dairy Cows, 2.
Veterinary Department, A Colonial, in Peace and in War, 107.
—— Education, A Plea for a Broader System of, with Special Reference to Indian Conditions, 158.
—— Jurisprudence, 151, 161, 193.
—— Science, A New Policy for, 74, 126.
—— Surgeon and Livestock Insurance, The, 110.
Virus Abortion, Equine, 27. (Abstract.)
Vitamin A Deficiency Not a Cause of Joint Lesions in Horses, 226. (Abstract.)

W

Warble Fly and Nicotine Sulphate, 179.
Will there be a Second Black Death? 283.
Witness, Expert, Role of the, 113.

J.R.

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